

### **Remarks/Arguments**

#### **Claim Amendments**

The amendments to Claims 1, 6-10, 17, and 20 are fully supported by the specification, in particular, by paragraphs [0013] and [0014]. Therefore, no new matter has been added.

#### **Rejection of Claims 1 and 17 under 35 U.S.C. §112, Second Paragraph**

The Examiner rejected Claims 1 and 17 under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully traverses the rejection.

The Examiner stated: "In particular, Claim 1 lines 4-5 states "determine at least one intermediate value", it is unclear how one would determine one intermediate value of said customized index call option.."."

The Examiner stated: "In particular, Claim 17 lines 2-3 states "determine at least one intermediate value", it is unclear how one would determine one intermediate value of said customized index call option..."."

The procedure for determining intermediate values, for example, as recited in Claims 1 and 17, is disclosed in source code AM23.DPR, and is described in paragraphs [0085-0089] of the specification for the instant application. The source code and the preceding paragraphs outline the procedure for determining intermediate values and interpolating between them to obtain an option value as recited in Claims 1 and 17 as follows:

#### **Function makeLattice method of operation**

The function makeLattice has the following prototype:

```
function makeLattice(rin, din, sigmain, gin, minpartin, maxpartin: double;  
                    tmaxin, xmaxin, htin, hxin: double): PLattice;
```

in which the parameters have the following meanings:

- rin is the continuously-compounded risk-free rate;

- `din` is the continuously-compounded dividend rate;
- `sigmain` is the index volatility;
- `gin` is the guaranteed rate for constant growth linkage;
- `minpartin` is the minimum participation rate in subsequent calls to `value_am`;
- `maxpartin` is the maximum participation rate in subsequent calls to `value_am`;
- `tmaxin` is the maximum time to expiry in subsequent calls to `value_am`;
- `xmaxin` is the maximum value of `X` (the state variable) to enter the recursion;
- `htin` is the time spacing used in constructing the lattice of vectors; and
- `hxin` is the spacing on `X` (the state variable) used in constructing the lattice of vectors.
- Typical call parameters are `init_am(0.06, 0.008, 0.3, 0.05, 0.4, 1.2, 5, 10, 0.1, 0.02)`. If either `ht` or `hx` is too large, then the values returned by `value_am` in later calls will not be sufficiently accurate: if `ht` and `hx` are too small, then RAM usage and initialization time may become excessive.

The function creates a lattice of vectors based on the specified input values and returns a pointer to it. The computation proceeds in 7 stages:

Stage 1 - computation of index up-move and down-move sizes and their corresponding risk-neutral probabilities,

Stage 2 - calculation of option payoff boundary values on coarse and fine `X` vectors, together with their first and second differences,

Stage 3 - partial allocation of the lattice of vectors,

Stage 4 - copying of boundary conditions from grids to lattice of vectors,

Stage 5 - precomputation of partial and integral displacements for quadratic stencil interpolation assuming constant growth linkage,

Stage 6 - precomputation of partial and integral displacements for quadratic stencil interpolation assuming index linkage,

Stage 7 - application of the Bellman recursion recursively backwards, using SIMD-specific procedures if the SIMD instruction set is available, on coarse and fine vectors, copying Richardson-extrapolated value to the lattice of vectors.

Function getValueAtEpoch method of operation

The function getValueAtEpoch has the following prototype:

```
function getValueAtEpoch(s: double; x: double; const lat: PLattice;  
    const ep: PEpoch): double;
```

in which the parameters have the following meanings:

- s is the current value of the index;
- x is the value of the state variable;
- lat is a pointer to a lattice of vectors; and
- ep is a pointer to an epoch record (a vector of lattice nodes all with the same time to expiry).

The function calls binarySearch to find two lattice nodes with index values bracketing s, linearly interpolates option values on x for each of the nodes, and then linearly interpolates those interpolated values on s to get an option value.

Function getValue method of operation

The function getValue has the following prototype:

```
function getValue(const s: double; const x: double; t: double;  
    const lat: PLattice): double;
```

in which the parameters have the following meanings:

- s is the current value of the index;
- x is the value of the state variable;

- $t$  is the time to expiry of the option; and
- $lat$  is a pointer to a lattice of vectors.

The function finds two epochs bracketing  $t$ , calculates  $rt = \sqrt{t}$ , calls `getValueAtEpoch` for each of the epochs, and then linearly interpolates those results on  $rt$ .

Thus, `makeLattice` makes the data structure of intermediate values and `getValue` and `getValueAtEpoch` interpolate them.

#### Rejection of Claims 1-23 under 35 U.S.C. §102

The Examiner rejected Claims 1-23 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 7,024,384 (Daughtery). Applicant respectfully traverses the rejection. Anticipation requires that all of the elements of the claim be taught within the four corners of a single reference.

#### **Claim 1**

##### Daughtery does not teach a customized indexed call option

Claim 1 recites: “wherein said customized indexed call option comprises a term and an index linkage to an index and a constant growth rate and wherein a holder of said customized indexed call option has the ability to switch between said index and said constant growth rate at predefined intervals during a term for said option.” A customized indexed call option has been fully defined in paragraph [0014] and the above claim limitation is further supported by paragraph [0013]. Additional support for the amendment is provided in numerous other portions of the specification.

##### Daughtery does not teach a term for an option

Claim 1 recites: “wherein said customized indexed call option comprises a term...” In contrast, the very heart of Daughtery’s teachings is a “timeless” or “expirationless option.” For example: “Therefore, there exists a need in the art for a technique to limit the risk that an option purchaser must assume, which at the same time, is not unfair to the option Seller. More specifically, there exists a need in the art for an apparatus and process for calculating an option

which is not dependent on "time" and is a fair value for the option Seller. The applicant refers to such an option as an "expirationless option." (Col. 4, lines 1-7).

"Accordingly, the present invention uses the expiring option premium algorithms to discount the effect of "time" according to the following process: (1) the exercise price is set equal to the current price of the asset and (2) the option premium is set equal to the margin requirement for the asset." (Col. 7, lines 12-16). Further, Claim 1 of Daughtery recites: "A computer implemented method for valuing an instrument, comprising: receiving data associated with a financial instrument; processing the data using a processor to determine an expirationless option value for the financial instrument using an expirationless option, the expirationless option value being less than an underlying asset value of the instrument; and computing a value for the financial instrument using the expirationless option value instead of the underlying asset value in an option pricing algorithm." Daughtery asserts that options with terms are the very problem that he is solving and all of Daughtery's teachings are away from the concept of a term for an option.

Daughtery does not teach more than one underlying for an option

Claim 1 recites: "an index linkage to an index and a constant growth rate ..." That is, the option recited in Claim 1 has two underlyings. In contrast, Daughtery teaches options with only a single underlying, for example, as recited in Claim 1 of Daughtery.

Daughtery does not teach switching underlyings

Claim 1 recites: "wherein a holder of said customized indexed call option has the ability to switch between said index and said constant growth rate at predefined intervals during a term for said option." Daughtery teaches only a single underlying for the expirationless option, Daughtery also teaches that underlying cannot be changed. Daughtery further does not teach a term for an option or predefined intervals during a term for an option.

For all the reasons noted above, Daughtery fails to teach each and every element of Claim 1. Therefore, Claim 1 is novel with respect to Daughtery. Claims 2 and 3, dependent from Claim 1, enjoy the same distinction with respect to Daughtery.

#### **Claim 4**

##### Daughtery does not teach a term for an option

Claim 4 recites: “a customized indexed call option with a specified term..” The arguments for Claim 1 regarding a term for an option are applicable to Claim 4.

##### Daughtery does not teach intervals in an option term or changing an index linkage

Claim 4 recites: “and specified notional amount  $n$  operatively arranged to allow an investor to choose notional amounts  $n_0$  and  $n_1$  at *specified intervals* within the term...” The arguments for Claim 1 regarding intervals are applicable to Claim 4.

##### Daughtery does not teach more than one underlying

Claim 4 recites: “such that  $n_0 \geq 0$ ,  $n_1 \geq 0$ , and  $n_0 + n_1 \leq n$ , while guaranteeing nonnegative total credited interest over the term, where interest credited on the notional amount  $n_0$  is based upon an arbitrary but specified nonzero interest rate, and interest on the notional amount  $n_1$  is credited based on changes in a specified index.” Thus Claim 4 recites two indices. The arguments for Claim 1 regarding multiple underlyings are applicable to Claim 4.

For all the reasons noted above, Daughtery fails to teach each and every element of Claim 4. Therefore, Claim 4 is novel with respect to Daughtery.

#### **Claim 5**

##### Daughtery does not teach a term for an option

Claim 5 recites: “a customized indexed call option with a specified term...” The arguments for Claim 1 regarding a term for an option are applicable to Claim 5.

##### Daughtery does not teach intervals in an option term or switching underlyings

Claim 5 recites: “and specified notional amount  $n$  operatively arranged to allow an investor to choose notional amounts  $n_i$  at specified intervals within the term ...” The arguments for Claim 1 regarding intervals and switching underlyings are applicable to Claim 5.

##### Daughtery does not teach more than one underlying

Claim 5 recites: “such that  $i$  is an integer such that  $0 \leq i \leq k$ ,  $n_i \geq 0$ , and  $\sum n_i \leq n$ , while guaranteeing nonnegative total credited interest over the term, where interest credited on the notional amount  $n_0$  is based upon an arbitrary but specified nonzero interest rate, and interest on

the notional amount  $n_i$ ,  $i \geq 1$ , is credited based on changes in specified index  $i$ , where  $k$ , the number of specified indices, is an integer greater than or equal to one..” The arguments for Claim 1 regarding multiple underlyings are applicable to Claim 5

For all the reasons noted above, Daughtery fails to teach each and every element of Claim 5. Therefore, Claim 5 is novel with respect to Daughtery.

**Claims 6-10, 17, and 20**

Each of Claims 6-10, 17, and 20 recite: “wherein said customized indexed call option comprises a term and a linkage to at least two indices and wherein a holder of said customized indexed call option has the option to change said index linkage at predefined intervals during a term for said option.” This is the same limitation recited in Claim 1. Therefore, the arguments for Claim 1 are applicable to Claims 6-10, 17, and 20 and Claims 6-10, 17, and 20 are novel with respect to Daughtery.

Claims 11-16, dependent from Claim 10, enjoy the same distinction with respect to Daughtery. Claims 18 and 19, dependent from Claim 17, enjoy the same distinction with respect to Daughtery. Claims 21 through 23, dependent from Claim 20, enjoy the same distinction with respect to Daughtery.

Applicant courteously requests that the rejection be removed.

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**Conclusion**

Applicant respectfully submits that all pending claims are now in condition for allowance, which action is courteously requested.

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